

1.0 INTRODUCTION

This report is a summary of field inspection results during construction of the Muscoy Operable Unit (OU) Plant Transmission Pipeline, Phase 2 construction.

The construction inspection was performed by URS Group, Inc. (URS) for the United States Environmental Protection Agency (EPA). URS performed the inspection under contract number 68-W-98-225 and work assignment member 069-RARA-09J5.

1.1 BACKGROUND

During a groundwater investigation in 1980, the California Department of Health Services (DHS) discovered chlorinated solvents in municipal supply wells within the northern San Bernardino/Muscoy region of San Bernardino. Several investigations were conducted to locate the potential source(s) of contamination. On March 30, 1989, EPA placed this region on the National Priorities List, thereby releasing federal funds for cleanup of the region, now identified as the Newmark Groundwater Contamination Superfund Site (site).

The principal contaminants identified in site investigations were trichloroethene (TCE) and tetrachloroethene (PCE). Reported concentrations of these contaminants exceed federal and California maximum contaminant levels (MCLs) for drinking water in several municipal wells within the San Bernardino and Muscoy areas, including the Newmark Municipal Wellfield.

A remedial investigation and a feasibility study were performed for the site between 1989 and 1994. Currently, the site is in remedial design and remedial action (RD/RA) phases. As part of the Newmark OU RD/RA, groundwater treatment systems and extraction wellhead facilities were installed and are currently operating. Design details of these facilities are presented in separate design documents. The Muscoy OU is currently in the RA phase, and this document is part of the RA effort for the Muscoy OU.

1.2 PROJECT DESCRIPTION

The Muscoy Plume OU RA includes construction of a pipeline (see Figure 1-1) that will connect five new groundwater extraction wells and one existing Newmark groundwater extraction well, with a total flowrate of 10,600 gallons per minute (gpm), to an existing City of San Bernardino Municipal Water Department (SBMWD) water treatment plant (that will be expanded and modified) located on W. 19th Street (19th Street Plant). After treatment at the 19th Street Plant, the treated water will be conveyed through existing SBMWD transmission pipelines. Excess treated water will be provided to the San Bernardino Valley Municipal Water District (SBVMWD) through a new connection and pump station located near Encanto Park on W. 9th Street. The pipeline system will serve several functions prior to the actual transmission of contaminated water for treatment at the 19th Street plant. Initially, various segments of the pipeline will be used to support the extraction well pump tests by providing a means to dispose of untreated water.

The pipeline is being installed in three phases under three construction contracts, which include the following:

1. **Temporary Waste Pipeline.** A 30-inch diameter section of the DIP transmission pipeline from N. Pennsylvania Avenue to the extraction well at W. Virginia Street. This section of

pipeline was installed first (November 2000 through February 2001) and will perform as a temporary waste line in order to perform the necessary pump tests on Extraction Well 112.

2. **Transmission Pipeline.** This construction inspection report covers the scope of work under Phase 2. Phase 2 was performed from August 2002 through May 2003 in two sub-phases, Schedule 1 and Schedule 2, described below.
 - The Schedule 1 work included the pipeline on W. Virginia Street and W. 14th Street from N. Medical Center Drive to N. Perris Street and W. Home Avenue; and the connections to wells 109, 110, and 111.
 - The Schedule 2 work included the pipeline from the 19th Street Treatment Plant along N. Pennsylvania Avenue and W. 16th Street to a previously completed section of the pipeline at W. Magnolia Street; the pipeline from N. Perris Street to Interstate 215 along W. Orange Street, N. Harris Street, and N. I Street; continuing from the future crossing location of Interstate 215 to W. 13th Street along W. 10th and N. H. Streets; the pipeline on W. 10th Street and N. Stoddard Avenue; and the pipeline in Encanto Park between W. 9th and W. 10th Streets.
3. **Freeway/Railroad Bore.** The boring underneath the railroad and freeway. This work is planned for late 2003.

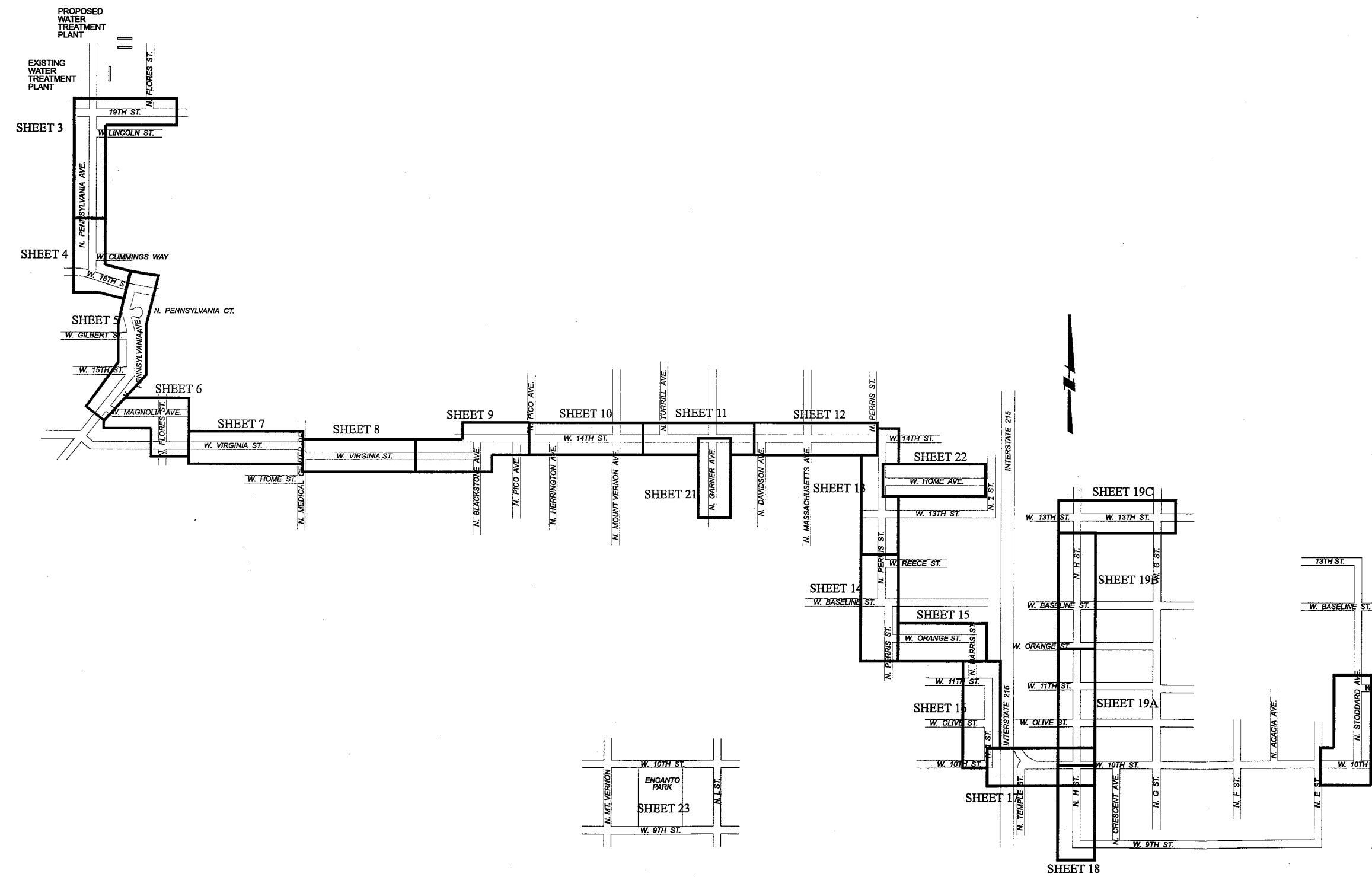


Figure 1-1: Muscoy OU RA Pipeline Route

2.0 CONSTRUCTION SUMMARY

2.1 MONTHLY SUMMARIES

The field construction activities began with the pipeline installation work in the Schedule 1 area on August 19, 2002 and continued through the completion of the Schedule 2 work on May 23, 2003. The following monthly summaries describe the construction fieldwork that was completed during each month of the project, important issues that arose during the month, and the issues' resolution. The detailed Weekly Construction Progress Reports that were prepared by the URS Construction Manager, Matt Dwyer, are included in Appendix A, and the detailed Inspector's Daily Reports that were prepared by the URS Resident Inspector, Nick Reylek, are included in Appendix B.

August 2002 (Weekly Reports 1 and 2)

- The successful bidder, El-Co Contractors, mobilized equipment and materials to the project site to begin the work on Schedule 1 at W. Home Ave.
- 1,770 feet of 24-inch DIP and 12-inch PVC pipe were installed (from station 13+21 to Station 10+00 and from Station 113+05 to station 101+00).
- El-Co discovered an unmarked manhole beneath the asphalt surface at the intersection of W. 14th St. and N. Massachusetts Ave. The DIP and PVC pipelines were rerouted to the north side of W. 14th St. to avoid the active manhole.

September 2002 (Weekly Reports 3 – 6)

- 580 feet of 24-inch DIP, 2,934 feet of 30-inch DIP, and 3,514 feet of 12-inch PVC pipe were installed (from station 101+00 to station 65+86).
- El-Co discovered a concrete encased utility duct bank along the east side of N. Mount Vernon Ave. The DIP and PVC pipelines were rerouted below the duct bank.

October 2002 (Weekly Reports 7 – 10)

- 405 feet of 30-inch DIP and 12-inch PVC pipe were installed (from station 65+86 to station 61+81). The 12-inch PVC pipe connection to the storm drain at N. Mt. Vernon Ave. was installed, and the 400 feet of 16-inch DIP on N. Garner Ave. to well site 110 was installed. This completed the pipe installation activities for the Schedule 1 work area.
- Hydrostatic testing of the DIP and PVC pipelines was successfully completed for the Schedule 1 work.
- Asphalt paving of all Schedule 1 pipe trenches was completed.
- The Public Works Department informed El-Co that they needed to request inspections from the department for each day that they will be working on City streets. El-Co replied that

they would call the department each day until the project is completed to request inspections for the next day's work.

- The Public Works Department informed URS and El-Co that there could be no work in the business district between Thanksgiving and New Years Day. James Dye/SBMWD informed URS that he would research the validity of this statement.
- El-Co was requested to review their work schedule and to potentially revise the schedule to complete the pipe installation work on the east side of Interstate 215 early if it was determined by SBMWD and EPA that this would be needed to accommodate the well pump test schedule of SBMWD. El-Co provided an estimate of the cost impact that this revised work schedule would cause.

November 2002 (Weekly Reports 11 – 15)

- El-Co completed the flushing and chlorination activities on the Schedule 1 pipelines, and SBMWD collected the bacteria test samples.
- The tie-in to the existing 30-inch DIP at W. Virginia St. was completed.
- El-Co mobilized equipment and materials to W. Magnolia Ave. and N. Pennsylvania Ave. to begin the Schedule 2 work.
- 1,750 feet of 30-inch DIP was installed (from station 40+10 to station 26+06 in the southern section, and from station 13+43 to station 10+17 in the northern section of this western portion of the Schedule 2 work area).
- In mid-November, the Public Works Department requested that El-Co change their work schedule and move to the north and install the 30-inch DIP on N. Pennsylvania Ave. and 19th St. This request was made by the department so that the DIP installation would be completed prior to the mobilization of the City's contractor that would be installing the new park at the intersection of N. Pennsylvania Ave. and 19th St. El-Co accommodated this request by the Public Works Department.

December 2002 (Weekly Reports 16 – 18)

- 1,263 feet of 30-inch DIP was installed (from station 13+43 to station 26+06). The storm drain connection at W. 16th and N. Pennsylvania Ave., which included a revised piping connection and a larger concrete vault installation, was completed. This completed the pipe installation for this western portion of the Schedule 2 work area.
- El-Co discovered that for a section of the pipeline on N. Pennsylvania Ave. (from station 13+50 to station 25+50) the existing sewer laterals were buried deeper than the design plans had shown. This required that the 30-inch DIP be installed 1-foot deeper in this section.
- Hydrostatic pressure testing was successfully completed for this section of 30-inch DIP. Flushing and chlorination activities were completed, and SBMWD collected the bacteria test samples from this section of the pipeline.
- The tie-in to the existing 30-inch DIP at W. Magnolia Ave. was completed.

- Asphalt paving of this western portion of the Schedule 2 work area was completed.
- James Dye/SBMWD requested that El-Co install a new 16-inch butterfly valve south of the storm drain connection on N. H St., and also to install a larger concrete vault at this storm drain connection.
- El-Co was requested to mobilize to the east side of Interstate 215 and begin the pipe installation work on N. H St. to be able to accommodate SBMWD's well pump test schedule for well 108.

January 2003 (Weekly Reports 19 – 22)

- El-Co mobilized equipment and materials to W. 9th St. to begin the Schedule 2 work on the east side of Interstate 215.
- 707 feet of 16-inch DIP and 345 feet of 20-inch DIP were installed (from station 159+87 to station 149+35), and 2200 feet of 16-inch DIP was installed (from station 10+00 to station 32+00). (Note: the station numbering system changed at the intersection of W. 10th St. and N. H St.)
- At the intersections of N. H St and W. 10th St., and N. H St. and W. 11th St. El-Co encountered a water main and two concrete encased sewer mains that required the DIP to be routed over these two locations. URS engineers reviewed the new alignment and requested that two new air vacuum relief valves be installed in these intersections.
- The butterfly valve requested by SBMWD was installed south of the storm drain connection on N. H St.

February 2003 (Weekly Reports 23 – 26)

- 473 feet of 16-inch DIP was installed (from station 32+00 to station 36+73), and the connection to well 108 was completed. This completed the portion of the pipeline on the east side of Interstate 215 along N. H St. from W. 9th St to W. 13th St.
- Hydrostatic pressure testing was successfully completed for this 16-inch and 20-inch DIP. Flushing and chlorination activities were completed, and SBMWD collected the bacteria test samples from this section of the pipeline.
- Asphalt paving of this portion of the Schedule 2 work area was completed.
- El-Co mobilized equipment and materials to the N. Stoddard Ave. work area.
- 853 feet of 16-inch DIP was installed along W. 10th St. and N. Stoddard Ave. (from station 175+35 to station 183+88). This completed the DIP installation for this portion of the pipeline.
- Hydrostatic pressure testing was successfully completed for this 16-inch DIP. Flushing and chlorination activities were completed, and SBMWD collected the bacteria test samples from this section of the pipeline.
- Asphalt paving of this portion of the Schedule 2 work area was completed.

- El-Co mobilized equipment and materials to N. Perris St. to begin the final portion of the pipeline installation work on the west side of Interstate 215.
- 345 feet of 20-inch DIP was installed (from station 113+05 to station 116+50).

March 2003 (Weekly Reports 27 – 30)

- 2,891 feet of 20-inch DIP was installed (from station 116+50 to station 145+41). This completed the DIP installation for this portion of the pipeline and for all of the Schedule 2 work, except for the Encanto Park area.
- Hydrostatic pressure testing was successfully completed for this 20-inch DIP. Flushing and chlorination activities were completed, and SBMWD collected the bacteria test samples from this section of the pipeline.
- Asphalt paving of this portion of the Schedule 2 work area was completed.
- URS and El-Co attempted to obtain information from SBVMWD regarding the shut down of SBVMWD's 48-inch pipeline to allow for El-Co to install the 24-inch butterfly valve on W. 9th St. To date SBVMWD had not provided any confirmation regarding the shut down date or any information regarding the requirements for tying into their pipeline.

April 2003 (Weekly Reports 31 – 34)

- El-Co mobilized equipment and materials to the Encanto Park work area.
- 704 feet of 24-inch DIP was installed (from station 10+00 to station 14+00, and from station 14+24 to station 17+28). This work included the tie-in to SBMWD's 36-inch pipeline on W. 10th St., and the tie-in to SBVMWD's 48-inch pipeline on W. 9th St.
- SBVMWD required El-Co to install an insulation kit and fittings for the tie-in to their pipeline. El-Co also assisted SBVMWD in the shut down and draining of their pipeline to allow for the tie-in work to be completed this month.
- The Public Works Department requested that El-Co reinstall an 8-inch sanitary sewer main at the corner of W. Baseline St. and N. Perris St. URS and El-Co were previously directed by the City to cut and cap this abandoned sewer main and to lay the 20-inch DIP through the sanitary sewer's previous alignment. The sewer main was later found to be still active, so El-Co returned it to service and then rerouted the 20-inch DIP over the sewer main.

May 2003 (Weekly Reports 35 – 39)

- Hydrostatic pressure testing was successfully completed for the 20-inch DIP at the sanitary sewer reinstallation location (N. Perris St. area from W. Home St. to W. Orange St.) and for the 24-inch DIP in Encanto Park. Flushing and chlorination activities were completed on the two sections of the pipeline, and SBMWD collected the bacteria test samples from these sections of the pipeline.
- Asphalt paving was completed on N. Perris St. and at Encanto Park.

- The 12-foot wide asphalt-paving overlay on all of the trenches from both Schedule 1 and Schedule 2 areas was completed. This included the curb-to-curb paving of W. Virginia St. and W. Home St., and completion of the traffic control striping and lettering in all work areas.
- Vegetation areas of Encanto Park were restored to prework conditions.
- Performance testing of the pipeline, as directed and inspected by SBMWD, was completed.

2.2 QUALITY ASSURANCE TESTING SUMMARY

Soils and Compaction Testing

Signet Testing Labs, a certified independent testing lab, performed the soil laboratory testing and field compaction tests. The URS Resident Inspector, Nick Reylek, directed compaction testing locations and frequency. Tests were taken of the trench backfill, subgrade and base materials. All compaction tests were taken with a nuclear density gauge, using the Nuclear Density Gauge method per ASTM Standards D2922 and D3017. Trench backfill under the roadway was mechanically compacted to 90% of the maximum relative density, except for the top 6-inches of subgrade, which was compacted to 95% of the maximum relative density. Appendix C contains the laboratory testing and field compaction test results.

Hydrostatic Testing, Chlorination and Flushing

The hydrostatic tests were performed on sections of the newly installed pipeline as these sections of the pipeline were completed. SBMWD Inspector, Louis Torbitt witnessed the testing of each section of pipeline. The pipeline section was filled with water and was pressure tested at 150 pounds/inch continuously for a period of 2 hours. Water leakage was measured by determining the quantity of water required to maintain test pressure in the pipeline section. No additional water was needed on any section of the pipeline during these tests, and all sections passed the hydrostatic tests. The hydrostatic testing is documented in the Inspector's Daily Reports that are included in Appendix B.

Upon completion of successful hydrostatic testing, the pipeline sections were disinfected. Chlorine was introduced by a water injector into the pipeline section that was previously filled with water. The chlorine concentration was specified to be between 50 and 80 parts per million (ppm), and this mixture was retained inside the pipeline section for a 24-hour period. After this time period, the chlorine residual was specified to be at least 25 ppm. The SBMWD Water Quality Control Supervisor, Con Arrieta, confirmed the concentration of chlorine before and after the 24-hour duration. Following chlorination, all water in the pipeline section was flushed out until the replacement water showed the absence of chlorine.

Bacteria Testing

Con Arrieta/SBMWD collected water samples from all of the flushed sections of the pipeline and had the samples analyzed for the presence of Coliform Bacteria. All of the pipeline sections showed favorable test results. Copies of these test results are included in Appendix D.

2.3 SAFETY AND HEALTH

Installing pipelines on busy city and residential streets presents numerous challenges to the field crews completing the work. As such, the project was performed with a high degree of concern for the safety and health of the work force and the general public. El-Co conducted weekly tailgate safety meetings to enforce safe work practices and to discuss potential safety concerns of the crews and the local residents. URS' Regional Safety and Health Officer, John Parente, conducted an on-site audit of El-Co's pipe installation procedures to ensure that the work was performed in a safe manner. URS' Resident Inspector, Nick Reylek, conducted noise monitoring surveys during the performance of the work to verify that the construction noise generated by the pipe installation crews did not exceed OSHA noise standards. The noise monitoring results are included in Appendix E.

2.4 COMMUNITY RELATIONS

Due to the sensitive nature of relations with the local residential community URS worked with Jackie Lane/EPA and Russell Smith/SBMWD to develop a proactive approach to the community relations issue during the pipeline installation work. URS printed a door hanger to notify the local residents that the pipeline installation work would be passing through their neighborhood and listed the contacts to call if they had any questions. The URS Resident Inspector, Nick Reylek, placed these door hangers at each home approximately 1 to 2 weeks before the work reached their neighborhood. In addition, URS constructed project signs showing the EPA logo that were placed at each end of the project work site so that the local residents could identify the work as the EPA pipeline project.

During the installation of the pipeline there were several minor issues that were raised by the local residents. According to our planned approach, these issues were brought to the immediate attention of Russell Smith/SBMWD. All of the issues were handled in a rapid manner between Russell Smith, URS and El-Co to the satisfaction of the local residents. These issues are described in the Weekly Construction Progress Reports included in Appendix A.

2.5 CHANGE ORDER SUMMARY

The subcontract modifications during the construction of the pipeline resulted in a 2.94% increase in the subcontract value to El-Co. The following is a listing of the change orders:

CO #	Description	Amount
1.	Subcontract completion date extension	None
2.	Movement of URS supplied Schedule 1 pipe and fittings from SBMWD storage location	\$17,930.00
3.	Pipeline rerouting due to subsurface manhole at N. Massachusetts Ave.	\$34,769.40
4.	Additional pipe required for storm drain connection at N. Mt. Vernon Ave. - quantity change from bid sheet	\$14,400.00
5.	Revised storm drain connection and larger vault at N. Pennsylvania Ave. And W. 16 th st.	\$6,431.64
6.	Deeper DIP installation due to depth of sewer laterals on N. Pennsylvania Ave.	\$6,608.00
7.	Install butterfly valve and increase vault for storm drain tie-in on H St.	\$7,114.75
8.	Routing DIP over existing sewer mains at 10 th and 11 th Streets along N. H St., and install air/vac valves	\$10,322.56
9.	Remobilization efforts to west side of Interstate 215	\$3,029.00
10.	Additional fittings and valve required - quantity change from bid sheet	\$4,170.00
11.	Insulation kit and testing station for SBVMWD tie-in at Encanto Park and W. 9 th St.	\$999.36
12.	Reconnection of sanitary sewer main and rerouting of DIP at W. Baseline St. and N. Perris St.	\$21,173.66
13.	Deduct for unused items from bid sheet	<\$63,765.00>
14.	Additional air/vac valve - quantity change from bid sheet	\$8,700.00

2.6 CONSTRUCTION PHOTOS

Included in Appendix F are the photos taken during the pipeline installation by URS Resident Inspector Nick Reylek. Forty photos have been selected from the total of 328 that show the progress of the project from start to completion. These photos are printed in this document. Also in Appendix F is the complete photo log listing all 328 photos and a CD containing all of these photos.

2.7 FINAL INSPECTION

A Final Inspection of the entire completed pipeline installation project was conducted on June 12, 2003. Kim Hoang/EPA, Jackie Lane/EPA, Stacey Aldstadt/SBMWD, Bill Bryden/SBMWD, Russell Smith/SBMWD, Louis Torbitt/SBMWD, Bob Kemmerle/E2, Matt Dwyer/URS, Adam Harvey/URS, Nick Reylek/URS, John Wiles/El-Co, and Troy Kirtly/El-Co were in attendance to inspect the work, list any outstanding issues, and to give formal acceptance of the project if there were no outstanding issues remaining to be resolved. There were no outstanding issues to be resolved and the project was accepted. A copy of the signed Final Inspection and Acceptance Form is included in Appendix G.

2.8 CONCLUSION

The pipeline installation project was completed according to the plans and specifications. Record drawings of the completed pipeline have been prepared and are included in Appendix H.